

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WEN-HANN WANG, KONRAD K. LAI,
GURBIR SINGH, MANDAR S. JOSHI,
NITIN V. SARANGDHAR and MATTHEW A. FISCH

Appeal No. 96-3359
Application 08/204,592¹

ON BRIEF

Before KRASS, CARMICHAEL and LALL, Administrative Patent Judges.

CARMICHAEL, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of Claims 1-5 and 17-26, which constitute all the claims remaining in the application.

Claim 1 reads as follows:

¹ Application for patent filed March 1, 1994.

1. In a computer system including a memory coupled to a first processor having an internal cache, said first processor coupled to at least one remote agent on a bus, said bus supporting snooping by said first processor and said at least one remote agent, a method of operation comprising the steps of:

- (a) acquiring by said first processor an exclusive copy of a cache line;
- (b) setting a lock bit by said first processor to lock said internal cache;
- (c) processing said exclusive copy of said cache line by said first processor;
- (d) receiving by said first processor a request from said remote agent for said cache line;
- (e) transferring ownership, but not the data associated with, said cache line from said first processor to said remote agent;
- (f) clearing said lock bit by said first processor;
- (g) transferring the data associated with said cache line from said first processor to said remote agent.

The examiner's Answer cites the following prior art:

Chan et al. (Chan)	4,513,367	Apr. 23, 1985
Arnold et al. (Arnold)	5,175,837	Dec. 29, 1992
Tetzlaff et al. (Tetzlaff)	5,301,290	Apr. 5, 1994
Santeler et al. (Santeler)	5,325,535	Jun. 28, 1994
Tipley	5,369,753	Nov. 29, 1994

OPINION

The claimed invention relates to a distributed computer system that includes multiple processors (or agents). A processor sets a lock bit to lock its internal cache.

Ownership of a locked cache line is transferred before the

data is transferred. A bus couples the processors together and permits them to snoop the bus for memory transfers.

The claims all stand rejected under 35 U.S.C. § 103 as unpatentable over Arnold in view of Tipley. Claims 1-3 and 17-19 are further rejected under 35 U.S.C. § 103 as unpatentable over Tetzlaff in view of Chan and further in view of Tipley. Claim 24 is further rejected under 35 U.S.C. § 103 as unpatentable over Tetzlaff in view of Chan and further in view of Tipley and still further in view of Santeler.

Arnold in view of Tipley

Arnold shows in Figure 1 a distributed computer system with remote processors having cache memory. A system control unit centrally locks the caches and maintains a reserve list.

Tipley teaches in Figure 1 a distributed processor system wherein each processor has its own cache controller for snooping the bus. Tipley teaches that such snooping is done to maintain cache coherency.

According to the examiner, it would have been obvious to rearrange Arnold's system by eliminating the system control unit, attaching the processors directly to the memory bus, adding a cache controller to each processor, and making the cache controller snoop the bus and assume the locking function formerly performed by Arnold's centralized system control unit. Appellants argue that Tipley's distributed control system suggests no such overhaul of Arnold's centralized control system.

We agree with appellants. Such a major change to Arnold can only be adopted with impermissible use of hindsight. ***See Interconnect Planning Corp. v. Feil***, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985). Therefore, we will not sustain the rejection.

Tetzlaff in view of Chan and Tipley

Tetzlaff has a centralized system for locking a portion of main memory. Chan uses centralized system control units to search for conflicts, specifically so that the distributed processors are not burdened with performing cache coherency resolution tasks. Column 6, lines 39-45. Tipley, as above described, has no centralized system control units and

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requires the distributed processors to snoop for cache coherency.

We agree with appellants that Tipley's teachings about snooping the bus are too far removed from the centralized systems of Tetzlaff and Chan to be properly combinable in an obviousness rejection. Viewing the prior art as a whole, we find no suggestion for the claimed invention utilizing a bus supporting snooping, locking, and transferring ownership by distributed processors.

The examiner's reliance on Santeler, for the features of dependent claim 24, do not cure the defects in the basic rejection.

CONCLUSION

The rejections are not sustained.

REVERSED

ERROL A. KRASS)
Administrative Patent Judge)
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JAMES T. CARMICHAEL
Administrative Patent Judge

PARSHOTAM S. LALL
Administrative Patent Judge

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JTC/kis
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN
12400 Wilshire Boulevard
7th Floor
Los Angeles, CA 90025